

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks below is respectfully requested.

Claims 1, 2, 4-12 and 14-23 are currently pending before the Examiner.

Initially, applicants have enclosed an information disclosure statement, form PTO-1449 and the accompanying fee associated with the submission. If any additional fees are due with information disclosure statement, applicants hereby grant the USPTO to withdraw any fees as required from deposit account number 50-1863.

Additionally, applicants have enclosed terminal disclaimers to obviate the double patenting rejections over claims 1-30 of US Patent No. 6,585,820, in view of Song, 6,010,596; claims 1-23 of copending Application No. 10/525,917, in view of Song, 6,010,596; and claims 1-27 of copending Application No.10/528,471, in view of Song, 6,010,596. Reconsideration of this rejection is respectfully requested.

Claims 1, 2, 4-12 and 14-23 stand rejected under 35 USC § 103(a) as being unpatentable over Imai, US 5,120,355, in view of Song, US 6,010,596, in view of Luongo, US 6,251,979. The rejection is respectfully traversed.

Applicants' presently claimed invention, is directed towards an emulsion for lignocellulosic composite products, which comprise a wax, an alkyl phenol, at least one surfactant, a polynaphthalenesulfonic acid, an alkali metal hydroxide, water and a complexed starch, wherein the alkyl phenol is a C₂₄-C₃₄ methylene coupled alkyl phenol. Benefits of such an emulsion include lignocellulosic composite products that are dimensionally stable when exposed to moisture, do not swell when immersed in water, do not shrink when dried and have improved water resistant properties.

Imai, unlike applicants' claimed invention, does not teach the use of a C₂₄-C₃₄ methylene coupled alkyl phenol. Imai only teaches a hydrocarbon resin which may or may not contain phenol, wherein the only phenols taught or suggested are phenol, catechol, resorcinol and hydroquinone (Column 3, lines 54-63).

To provide a beneficial water resistant property, in the present invention, the wax crystals need to be aligned and able to coat the lignocellulosic composite products. The combination and reaction of applicants' C₂₄-C₃₄ methylene coupled alkyl phenol and the polynaphthalenesulfonic acid, acts to modify the wax crystal and allows the wax crystals to resist plating and linking with themselves and instead remain in a disassociated state until they are transferred due to polarity to the lignocellulosic composite products. These modified wax crystals are then able to align and coat the lignocellulosic composite products, providing applicants advantageous water resistant property. Imai does not teach the use of a C₂₄-C₃₄ methylene coupled alkyl phenol, the combination of C₂₄-C₃₄ methylene coupled alkyl phenol with a polynaphthalenesulfonic acid or the resultant improved water resistant property achieved from this novel combination.

Song does not resolve the deficiencies of Imai. Song does not teach the applicability of an aqueous wax emulsion solely for use with a lignocellulosic composite product. Song only teaches using an aqueous wax emulsion to improve a water resistant gypsum board.

One skilled in the art would not look at additives that relate to gypsum products if the problem that they were attempting to solve was for lignocellulosic composite products. Lignocellulosic composites are in the natural organic substrate industry which is a different industry than the inorganic calcium sulfate industry of gypsum. There are many differences between calcium sulfate and lignocellulosic composites such as the differences in substrate size and different processes of manufacture.

Luongo does not resolve the deficiencies of Imai in view of Song as discussed above. Luongo does not teach the applicability of an aqueous wax emulsion solely for use with a lignocellulosic composite product. Luongo teaches a wallboard composition comprising a

combination of synthetic binders with an expanded mineral (e.g. Perlite) that reduces the amount of gypsum used. The combination of Imai in view of Song, in view of the teachings of Luongo, would at best suggest lightening a gypsum board, by reducing the amount of gypsum used.

Moreover, applicants use of a complexing starch further distinguishes itself from Luongo. Generic starch in the prior art was unpredictable due to the uncontrollable viscosity that resulted from the storage conditions and additive chemistry. Applicants' emulsion produces unexpected beneficial results by crosslinking the wood fibers together, these benefits include superior performance as a water absorption control additive with a high level of stability both at high and low temperatures and an unchanging and predictable viscosity.

In previous systems without a complexed starch, adding wax to wood chips would cause non-uniform packets of wax to form on the wood chips. These packets of wax would be unpredictable, and therefore it was likely that one board would have 10% water resistance while another board would have 50% water resistance.

In the present invention, the complexed starch causes an increase in the water resistance of the lignocellulosic particles by crosslinking the wood fibers together, therefore increasing the level of linear migration of the wax. The crosslinked wood fibers provide a stable base for the uniform and predictable distribution of wax over the lignocellulosic particles, therefore increasing the level of linear migration of the wax. This is important so that the wood chips would not stick together in the manufacturing process of creating the lignocellulosic panels. If the wood chips are not properly lubricated, they will "stick and clump" together, and accordingly cause a backup in the manufacturing machine. Reconsideration of this rejection is respectfully requested.

Applicants do not believe that any additional fees are due in the submission of this response. However, if any fees are due, Applicants hereby grant the USPTO to withdraw any fees as required from deposit account number 50-1863.

In light of the above amendments and remarks, it is respectfully submitted that the pending claims of the present application are in condition for allowance. If the Examiner has any questions or requires additional information, he is invited to contact the undersigned.

Respectfully submitted,



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